

search for its own optimum code. Indeed, it is understood that different sequences and or protocols may be used for the procurement of optimum codes without significantly departing from the spirits of the present invention.

In summary, it has been shown that an initiating communication device uses a code reserved as a control code to establish communication with a target communication device. The target, like other communication devices in the system, idly receives this signal and uses the control code to despread it. The specification of the target communication device is made by an identifier in the modulated data. The first signal transmitted by the initiating communication device will include a request for a target communication device. The target communication device acknowledges this call and proceeds to determine an identify an optimum spreading code. This may be accomplished by using means square cross-correlation measurements between the channel and each of a number of available codes. Upon completion of these measurements the initiator and targeted communication devices both revert to the control code for spreading and despreading a exchange data on the channel conditions at each end. After this handshake, some algorithm to decide which code is mutually beneficial to be used by the initiator who would instruct the target which specific code would be used. It is noted that the initiator and the targeted communication devices may use different spreading codes in their outbound communication signals.

There are several benefits offered by the present invention over the prior art. First, communication devices need no longer be pre-programmed with spreading codes, since these codes are solicited by the originating devices. Second, existing codes may be dynamically reused. Codes may be reused as soon as they are dropped. This results in significant improvements in the availability of codes, hence higher efficiency. Third, the dynamic selection of codes is accomplished without the need for a central station. In other words, since a system in accordance with the present invention is self maintained there is no need for a separate station to keep track of codes in use.

I claim:

1. A Code Division Multiple Access (CDMA) communication system for reuse of available spreading codes, the system having a control spreading code and comprising:

- a first communication device for transmitting a first signal spread by the control spreading code, the first signal includes a request for a first spreading code;
- a second communication device, including:
  - a receiver for receiving the first signal;
  - means for identifying the first spreading code determined to be optimum for the reception of signals by the second communication device; and
  - a transmitter for transmitting the identity of the first spreading code to the first communication device;

whereby the first communication device communicates with the second communication device using the first spreading code.

2. The communication system of claim 1, wherein the first and second communication devices include Direct Sequence Code Division Multiple Access (DSSS) communication devices.

3. The communication system of claim 1, wherein the means for identifying identifies a plurality of spreading codes optimum for the reception of signals by the second communication device.

4. The communication system of claim 3, wherein the first communication device selects one of the plurality of spreading codes to communicate with the second communication device.

5. The communication system of claim 1, wherein the transmitter includes a controller for requesting a code that is optimum for the first communication device.

6. The communication system of claim 1, wherein the first communication device includes means for identifying a second spreading code optimum for the first communication device.

7. The communication system of claim 1, wherein the first communication device includes means for periodically checking for optimum codes and communicating them to the second communication device.

8. The communication system of claim 1, wherein the second communication device includes means for periodically checking for optimum codes and communicating them to the first communication device.

9. In a DSSS communication system having at least a first and a second communication device, a method for providing communication between the first and the second communication devices with optimum reuse of spreading codes, comprising the steps of:

in the first communication device:

transmitting a signal to the second communication device requesting a first spreading code;

in the second communication device:

receiving the signal;

identifying a first spreading code determined to be optimum for the reception of signals by the second communication device;

transmitting information about the first spreading code to the first communication device; and

receiving signals from the first communication device spread by the first spreading code.

10. The method of claim 9, further including the step of:

in the first communication device, identifying a second spreading code optimum for the first communication device.

11. The method of claim 10, further including the step of:

in the first communication device, transmitting the second spreading code.

12. The method of claim 9, further including the step of:

in the second communication device, receiving the second spreading code and communicating with the first communication device using the second spreading code.

13. The method of claim 9, further including the step of:

periodically updating the first and second spreading codes.

14. The method of claim 13, further including the step of: the first and the second communication devices communicating the updated spreading codes to each other as they are updated.

15. The method of claim 13, further including the step of:

the first and the second communication devices communicating with each other using the updated spreading codes.